

[illegible]

FIG. 1 (PRIOR ART)

FIG. 2 (PRIOR ART)

00000 5229900

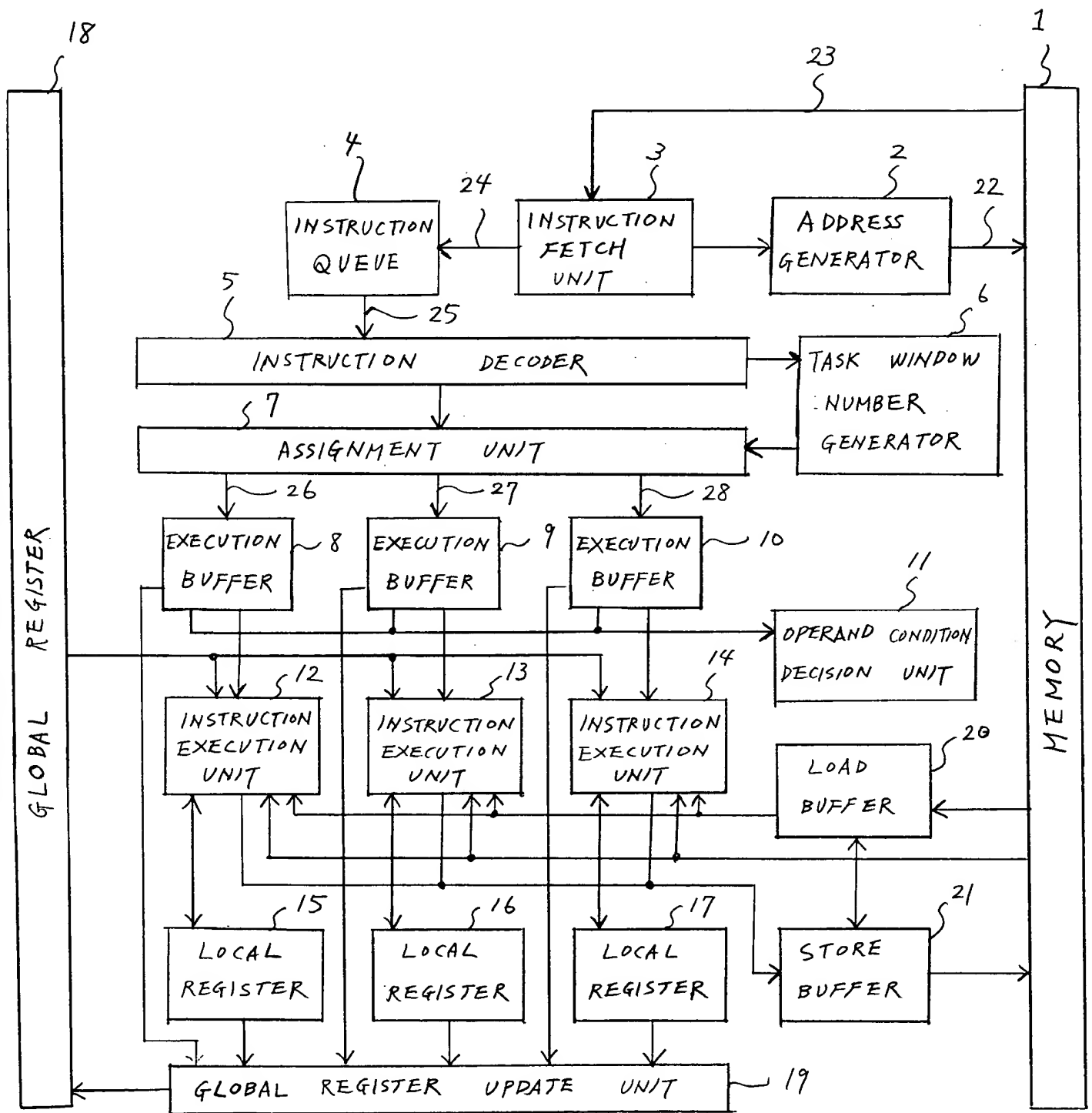


FIG. 3

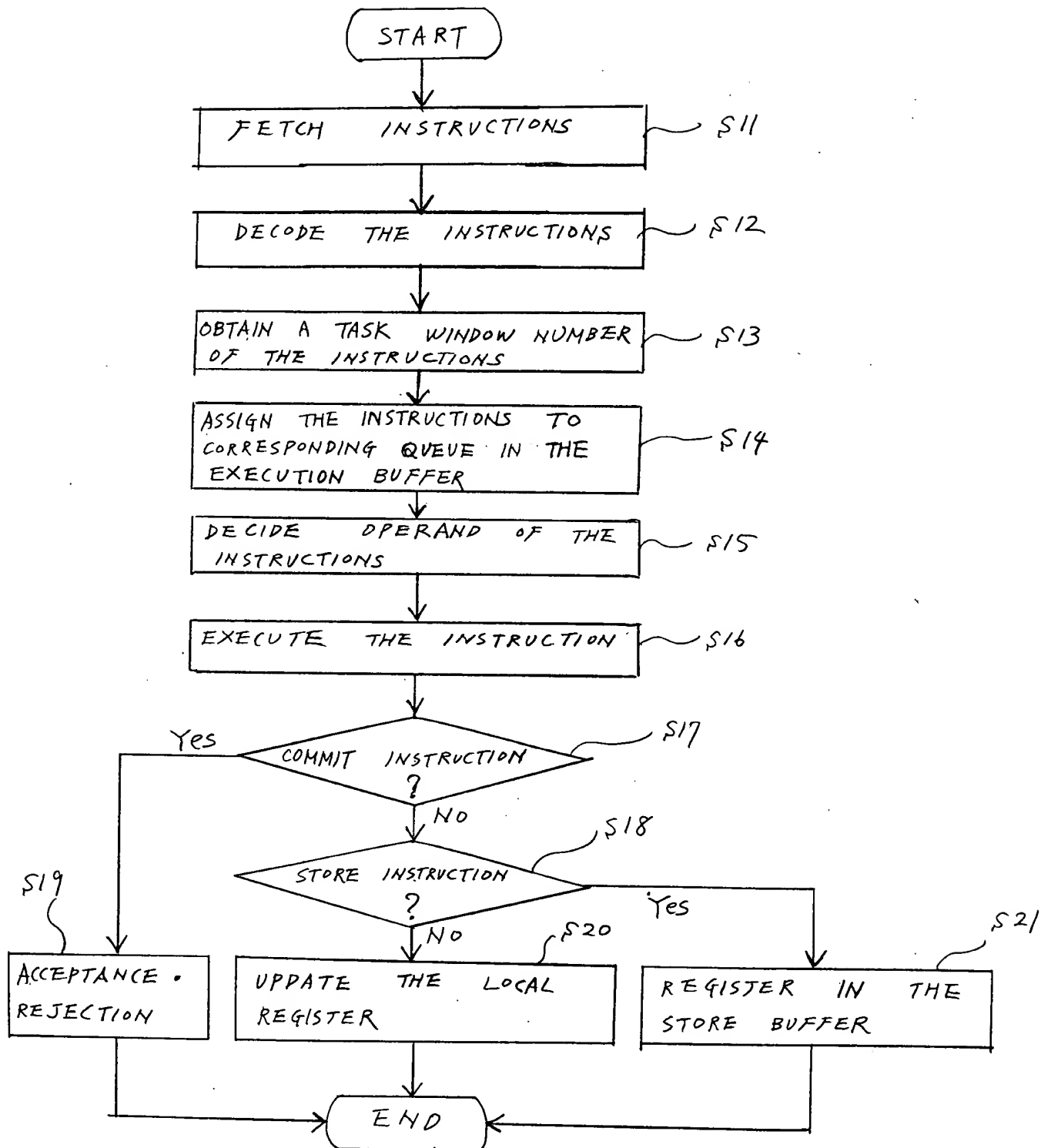
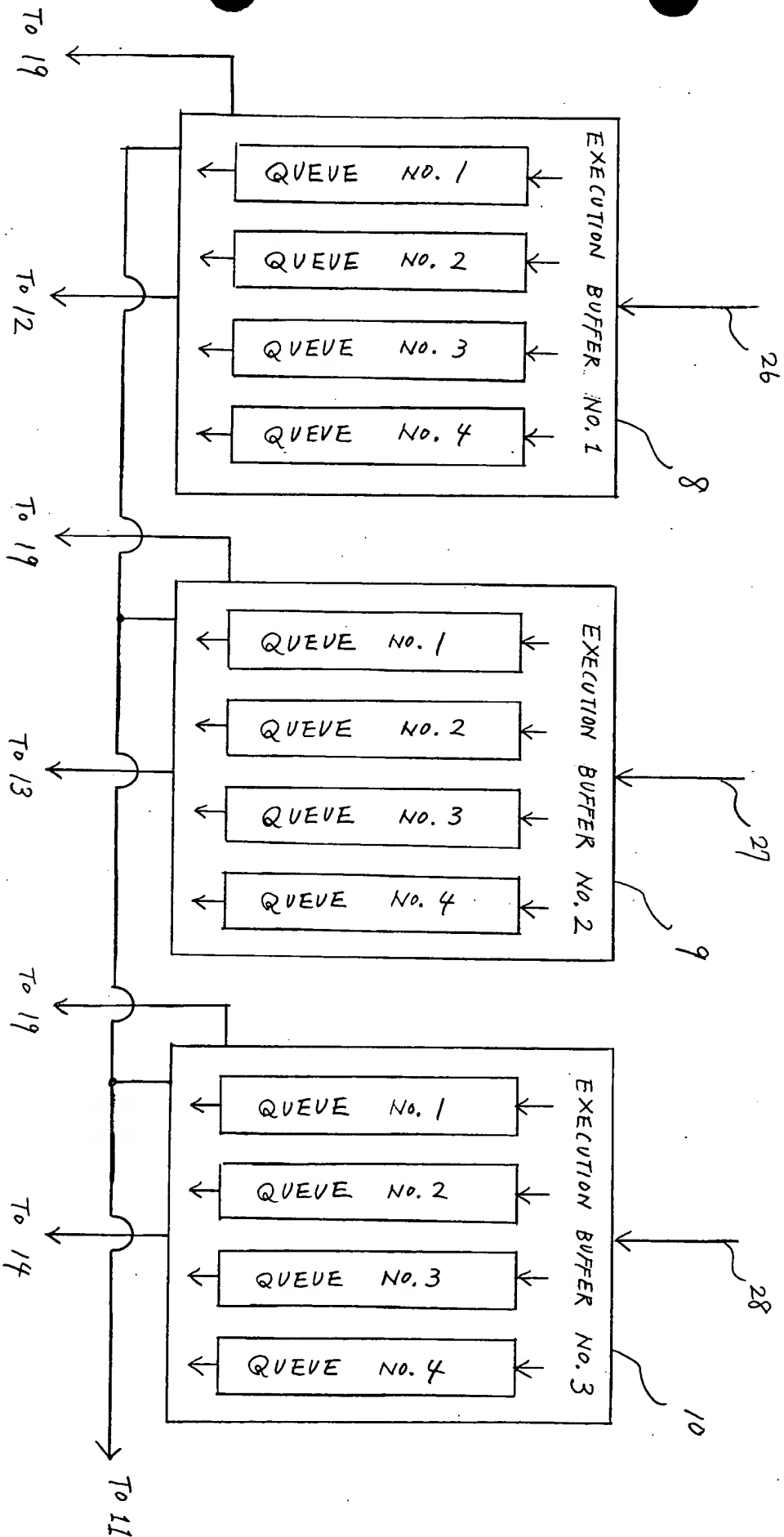


FIG. 4



F I G. 5

REGISTER	VALUE	VALID
\$ 1	100	1
\$ 2	15	0

EXAMPLE OF PROGRAM CODE

li P : \$ 2, 2

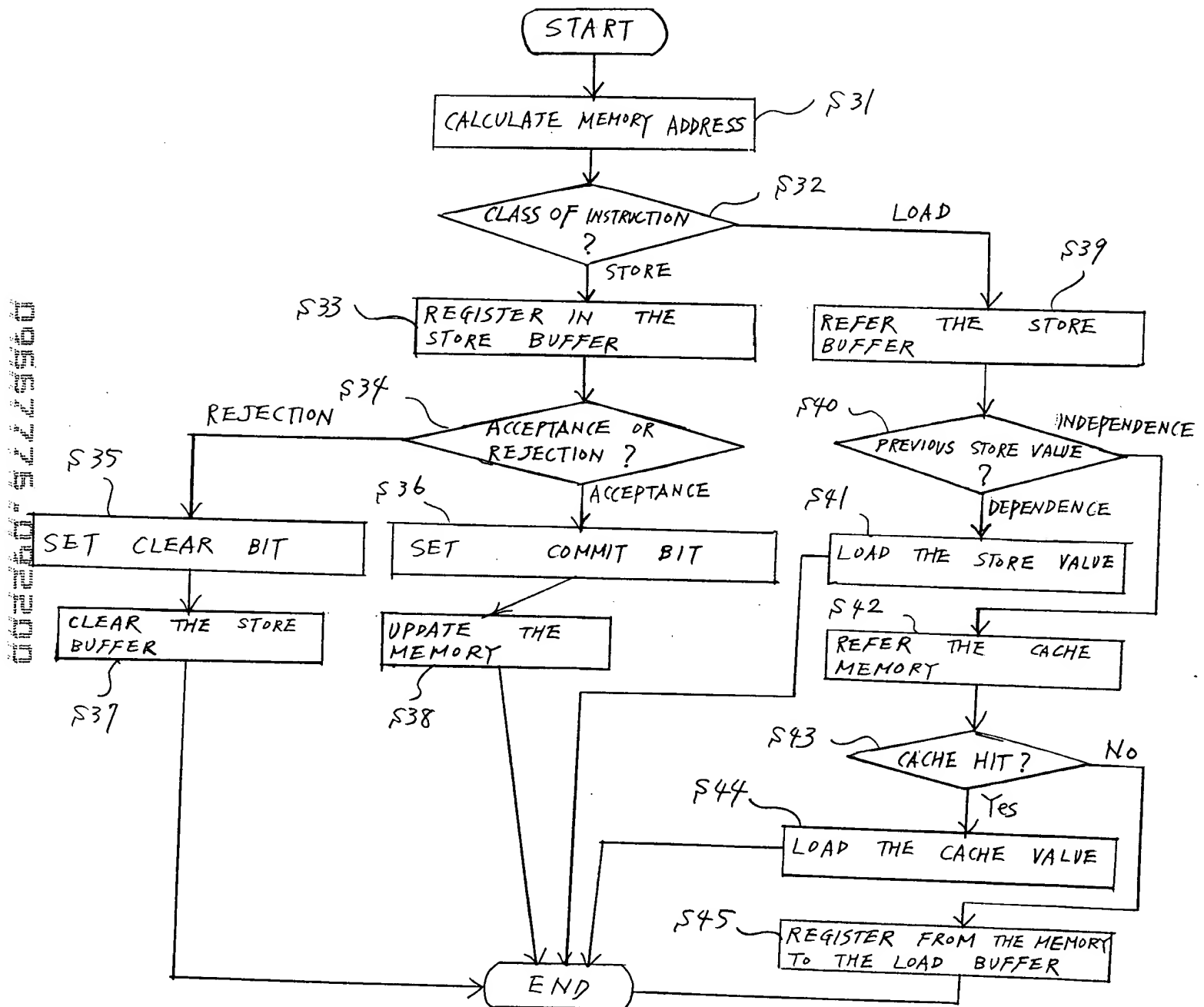
IN CASE OF DECODING, THE VALID OF REGISTER "\$2" IS SET "0" BY PRODUCTION FLAG "P:"

SW \$2, 0 (\$4)

THE REGISTER "\$2" IS NON-USE UNTIL THE VALID IS CHANGED TO "1".

IF THE VALUE "15" IS CHANGED TO "2", THE VALID "0" IS CHANGED TO "1".

FIG. 7



STORE ADDRESS	STORE VALUE	STORE WIDTH	TWID	CMT	CLR
10046e3c	3d70	H	1	0	0
10002a1e	1f	B	0	0	1
10015d60	1eb94	W	0	1	0

F I G. 9

LOAD ADDRESS	REGISTER FIELD	valid	RFL
100143e0	02,08,15,22,10,34,01,05	00101001	0
10003160	03,05,14,13,07,04,05,08	01000101	1

F I G. 10

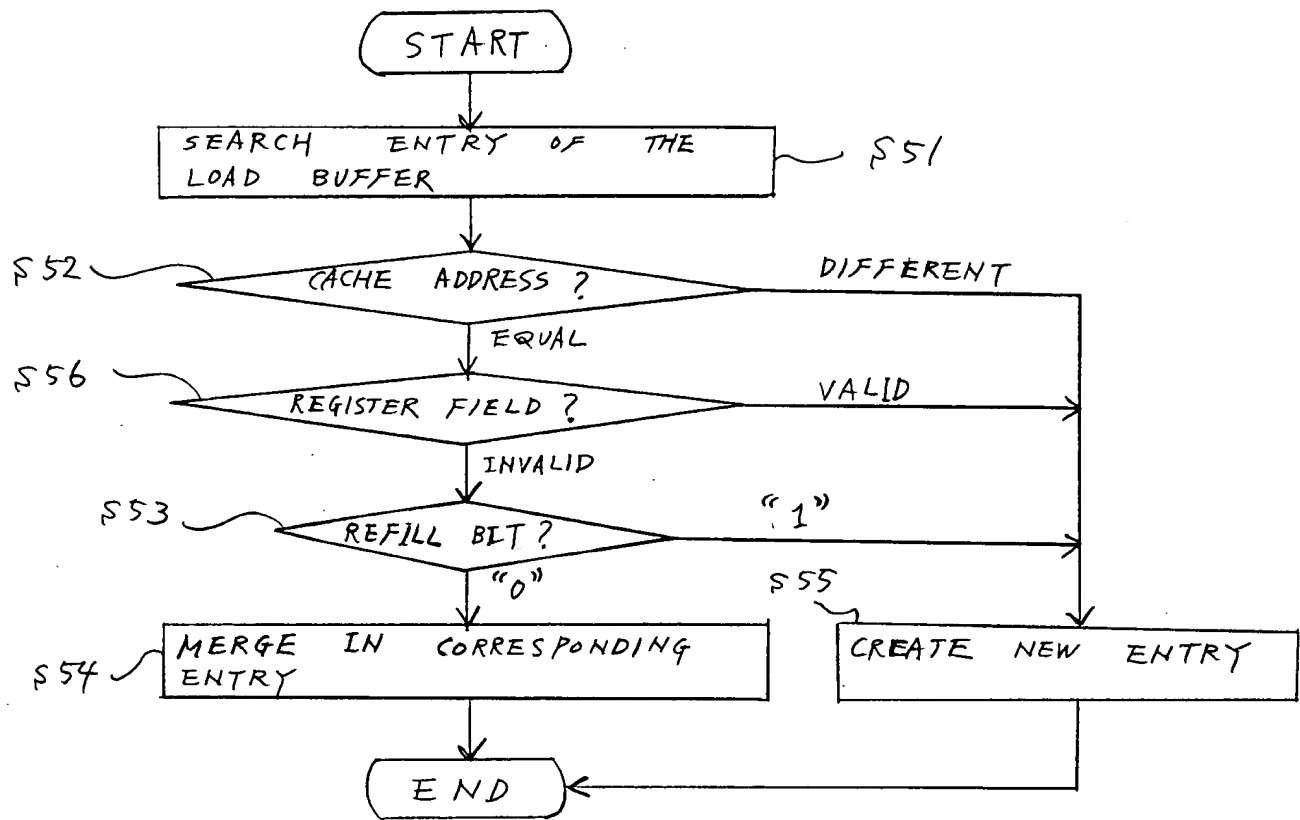


FIG. 11

TASK NUMBER	LOAD ADDRESS	LOAD WIDTH	CNF	VLD
3	1 0 0 0 9 2 3 a	H	0	1
4	1 0 0 1 0 2 4 c	W	1	0
2	1 0 0 2 1 4 9 d	B	1	1
	..			

FIG. 12


```

        lw. e    $4, Int_Glob ($0)
        slti     $3, $4, 101
        bne      $3, $0, $L14
        j         $L9
        sw       $0, 0 ($56)
$L14:    addiu    $3, $0, 3

```

FIG. 15

```

1: lw. e    $4, Int_Glob ($0)
2: sw       $0, 0 ($56)
1: slti     $3, $4, 101
1: bcmt. ne  $3, $0, $L14,
            |1, 2|, |2|
1: j         $L9
$L14: 2: addiu    $3, $0, 3

```

FIG. 16

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	lw	\$3, 0 (\$57)
	sw	\$16, 16 (\$sp)
\$L41:	lw	\$9, 0 (\$11)
	addiu	\$11, \$11, 16
	sw	\$9, 0 (\$3)
	bne	\$11, \$10, \$L41

FIG. 17

1:lw	\$3, 0 (\$57)
3:lw	\$9:P, 0 (\$11)
3: addiu	\$11, \$11, 16
4:sw	\$9, 0 (\$3)
2:sw	\$16, 16 (\$sp)
3:lcmnt. ne	\$11, \$10, \$L41, 3, 4 , 1, 2

Fr G. 19

TASK WINDOW NUMBER	TASK NUMBER	INSTRUCTION NUMBER
1	1:move P:\$_5, \$4	[1]
	1:addiu P:\$_1, \$0, 65	[2]
	1:addiu P:\$5, \$0, 1	[3]
	1:lw \$_1, 0 (\$_5)	[4]
	1:nop	[5]
	1:nop	[6]
	1:addiu P:\$6, \$_1, 10	[7]
	1:nop	[8]
	1:nop	[9]
	\$L46:	
	3:addiu \$6, \$6, --1	[10]
	2:lbu.e \$_2, Ch1_Glob (\$0)	[11]
	3:lw.e P:\$1_3, Int_Glob (\$0)	[12]
	3:subu P:\$_4, \$6, \$_3	[13]
	2:bcmt.ne \$_2, \$_1, \$L48	[14]
2	3_3, 3_4	
	4:move P:\$5, \$0	[15]
	4:sw \$_4, 0 (\$_5)	[16]
	2:nop	[17]
	4:nop	[18]
3	\$L48:	
	3:nop	[19]
	2:nop	[20]
	1:lcmt.ne \$5, \$0, \$L46	[21]
	1_3, 1_4, 2_2, 3_1, 3_3, 3_4 ,	
	1:rcmt \$31	[22]
	1_1	
	1:nop	[23]
	1:nop	[24]

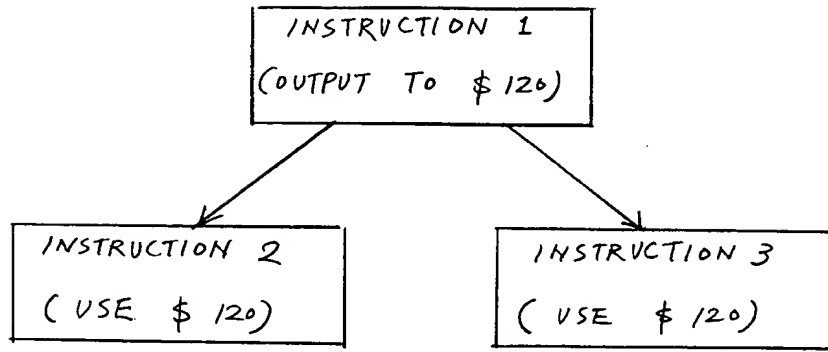


FIG. 21

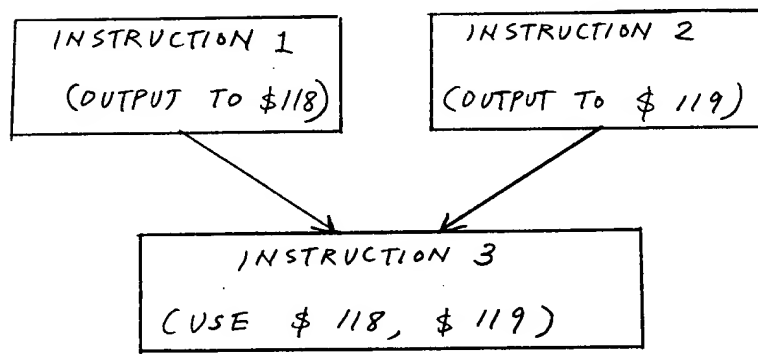


FIG. 22

reflect:

move \$114, \$6: move \$113, \$5: move \$112, \$4
slli \$115, \$114, 2: nop: nop
bne \$115, \$0, \$L109: nop: nop
lw.e \$117, boardsize(\$0): addiu \$116, \$113, 1: nop
subu \$113, \$117, \$116: nop: nop

SL109:

addiu \$118, \$0, 1: nop: nop
beq \$114, \$118, \$L111: nop: nop
addiu \$119, \$0, 3: nop: nop
bne \$114, \$119, \$L110: nop: nop

SL111:

lw.e \$121, boardsize(\$0): addiu \$120, \$112, 1: nop
subu \$112, \$121, \$120: nop: nop

SL110:

lw.e \$123, boardsize(\$0): nop: nop
mult \$113, \$123: nop: nop
nop: nop: nop
nop: nop: nop
mflo \$124: nop: nop
jr \$31: addu \$2, \$124, \$112: nop

FIG. 23

(BASIC BLOCK 1)

DATA DEPENDENCE SEQUENCE 1 - - - - - → $\left(\begin{array}{l} \text{move } \$114, \$6 \\ \text{slti } \$115, \$114, 2 \\ \text{bne } \$115, \$0, \$L109 \end{array} \right.$

DATA DEPENDENCE SEQUENCE 2 - - - - - → move \$113, \$5

DATA DEPENDENCE SEQUENCE 3 - - - - - → move \$112, \$4

(BASIC BLOCK 2)

DATA DEPENDENCE SEQUENCE 4 - - - - - → lw. e \$117, boardsize (\$0)

DATA DEPENDENCE SEQUENCE 5 - - - - - → $\left(\begin{array}{l} \text{addiu } \$116, \$113, 1 \\ \text{subu } \$113, \$117, \$116 \end{array} \right.$

(BASIC BLOCK 3)

DATA DEPENDENCE SEQUENCE 6 - - - - - → $\left(\begin{array}{l} \text{addiu } \$118, \$0, 1 \\ \text{beq } \$114, \$118, \$L111 \end{array} \right.$

(BASIC BLOCK 4)

DATA DEPENDENCE SEQUENCE 7 - - - - - → $\left(\begin{array}{l} \text{addiu } \$119, \$0, 3 \\ \text{bne } \$114, \$119, \$L110 \end{array} \right.$

(BASIC BLOCK 5)

DATA DEPENDENCE SEQUENCE 8 - - - - - → lw. e \$121, boardsize (\$0)

DATA DEPENDENCE SEQUENCE 9 - - - - - → $\left(\begin{array}{l} \text{addiu } \$120, \$112, 1 \\ \text{subu } \$112, \$121, \$120 \end{array} \right.$

(BASIC BLOCK 6)

DATA DEPENDENCE SEQUENCE 10 - - - - - → $\left(\begin{array}{l} \text{lw. e } \$123, \text{boardsize } (\$0) \\ \text{mult } \$113, \$123 \\ \text{nop} \\ \text{nop} \\ \text{mflo } \$124 \\ \text{addu } \$2, \$124, \$112 \end{array} \right.$

DATA DEPENDENCE SEQUENCE 11 - - - - - → jr \$31

FIG. 24

Elect:

```
lw. e $123, boardsize($0); move $114, $6; move $113, $5
mult $113, $123; slti $115, $114, 2; move $112, $4
nop: lw. e $117, boardsize($0); addiu $116, $113, 1
nop: bne $115, $0, $L109; subu $113, $117, $116
```

\$ L 1 0 9 :

```
mflo $124; addiu $118, $0, 1; addiu $119, $0, 3
nop: beq $114, $118, $L111; nop
nop: bne $114, $119, $L110; nop
```

```
addiu $120, $112, 1; lw. e $121, boardsize($0); nop
subu $112, $121, $120: nop: nop
```

```
addiu $2, $124, $112; jr $31; nop
```

FIG. 25

reflect:

3:lw.e \$123, boardsize(\$0); 1:move \$114, \$6; 1:move \$113, \$5
3:mult \$113, \$123; 1:slti \$115, \$114, 2; 2:move \$112, \$4
3:nop; 3:lw.e \$117, boardsize(\$0); 3:addiu \$116, \$113, 1
3:nop; 1:bne \$115, \$0, \$L109; 3:subu \$113, \$117, \$116

\$L109:

3:mflo \$124; 1:addiu \$118, \$0, 1; 3:addiu \$119, \$0, 3
3:nop; 1:beq \$114, \$118, \$L111; 3:nop
1:nop; 1:bne \$114, \$119, \$L110; 1:nop

\$L111:

1:addiu \$120, \$112, 1; 1:lw.e \$121, boardsize(\$0); 1:nop
1:subu \$112, \$121, \$120; 1:nop; 1:nop

\$L110:

1:addiu \$2, \$124, \$112; 1:jr \$31; 1:nop

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reflect:

3:lw.e \$123, boardsize(\$0): 1:move \$114, \$6: 1:move \$113, \$5
3:mult \$113, \$123: 1:slti \$115, \$114, 2: 2:move \$112, \$4

3:nop: 3:lw.e \$117, boardsize(\$0): 3:addiu \$116, \$113,

3:nop: 1:cmt.ne \$115, \$0.: 3:subu \$113, \$117, \$116

12_1, 2_3, 3_1, 3_2, 3_3, 12_3, 3_3

3:mflo \$124: 1:addiu \$118, \$0, 1: 3:addiu \$119, \$0, 3

3:nop: 1:bcmt.eq \$114, \$118, \$L111.: 3:nop

11_3, 2_1, 3_3, 3_4, 13_3, 3_4

3:nop: 1:bcmt.ne \$114, \$119, \$L110.: 1:nop

11_1, 2_1, 3_1, ||

111:

1:addiu \$120, \$112, 1: 1:lw.e \$121, boardsize(\$0): 1:nop

1:subu \$112, \$121, \$120: 1:nop: 1:nop

\$L110:

1:addiu \$2, \$124, \$112: 1:rcmt \$31.: 1:nop

11_1, 2_1

F I 9. 27

reflect:

```
3:lw.e $_1, boardsize($0); 1:move P:$_1, $6; 1:move P:$3, $5
3:mult $3, $_1; 1:slti $_1, $_1, 2; 2:move P:$7, $4
3:nop; 3:lw.e P:$3_2, boardsize($0); 3:addiu $_1, $3, 1
3:nop; 1:cmt.ne $_1, $0.; 3:subu $3, $_2, $_1
    |2_1, 2_3, 3_1, 3_2, 3_3|, |2_3, 3_3|
3:mflo P:$_2; 1:addiu $_2, $0, 1; 3:addiu P:$2_3, $0, 3
3:nop; 1:bcmt.eq $_1, $_2, $L111.; 3:nop
    |1_3, 2_1, 3_3, 3_4|, |3_3, 3_4|
1:nop; 1:bcmt.ne $_1, $_3, $L110.; 1:nop
    |1_1, 2_1, 3_1|, ||
$L111:
1:addiu $_3, $7, 1; 1:lw.e P:$1_4, boardsize($0); 1:nop
1:subu $7, $_4, $_3; 1:nop; 1:nop
$L110:
1:addiu $2, $_2, $7; 1:rcmt $31.; 1:nop
    |1_1, 2_1|
```

FIG. 28